

Claims

1. A process for the preparation of a water gas shift catalyst comprising

mixing a copper salt and a zinc salt with an aluminum component in an aqueous solution to form a catalyst precursor, wherein the aluminum component is prepared by mixing an aluminum salt with alumina, wherein from about 30 to about 95 percent by weight of the aluminum component comprises alumina;

5 precipitating a precipitate from the solution with a precipitating agent; and

10 drying, and forming the precipitate into the catalyst.

2. The process of Claim 1 wherein less than about 60%
15 of the aluminum present in the catalyst precursor is in the form of hydrotalcite.

3. The process of Claim 1, wherein the copper salt and zinc salt are selected from the group of metal salts consisting of nitrates, sulfates, chlorides, acetates and
20 combinations thereof, wherein the aluminum salt is selected from the group consisting of aluminum nitrate, aluminum sulfate and combinations thereof, and wherein the alumina is selected from the group consisting of bohmite, bayerite, gibbsite and combinations thereof.

4. The process of Claim 1, wherein the copper salt, zinc salt and the aluminum component are mixed in solution at a temperature from about 40°C to about 80°C.

5. The process of Claim 1 further comprising neutralizing the solution to a pH between about 6 and about 9 during precipitation.

6. The process of Claim 1, wherein the concentration of the metal salts and the aluminum component within the solution is from about 5 wt.% to about 30 wt.%.

10 7. The process of Claim 1, wherein the alumina comprises from about 40 to about 95% of the aluminum component.

15 8. The process of Claim 1, wherein the catalyst before reductive activation comprises from about 5 to about 70% copper oxide, from about 20 to about 50% zinc oxide, and from about 5 to about 50% aluminum oxide.

20 9. The process of Claim 1, further comprising adding a promoter, stabilizer or combination thereof to the solution, wherein the promoter or stabilizer is selected from the group consisting of potassium, rubidium, cesium, titanium, zirconium and mixtures thereof.

25 10. The process of Claim 1, wherein the BET surface area of the catalyst is from about 40 m²/g to about 200 m²/g and the copper surface area of the catalyst is greater than about 15 m²/g.

11. A process for the production of a water gas shift catalyst comprising;

preparing aqueous solutions of a copper salt and zinc salt;

5 separately preparing an aluminum component by mixing an aluminum salt with an alumina, wherein from about 30 to about 95% by weight of the alumina component comprises alumina;

10 mixing the aluminum component with the copper/zinc salt solution to form a catalyst precursor;

precipitating a precipitate from the solution with a precipitating agent; and

drying, and forming the precipitate into the catalyst.

15 12. The process of Claim 11 wherein less than about 60% of the aluminum present in the catalyst precursor is in the form of hydrotalcite.

13. The process of Claim 11 wherein the aluminum component is prepared by neutralizing a basic aluminate with
20 an acidic material in solution at a pH from about 6 to about 9.

14. The process of Claim 13 wherein the aluminate is selected from the group consisting of sodium aluminate, potassium aluminate and mixture thereof.

15. The process of Claim 11, wherein the aluminum component is prepared by blending an acidic aluminum salt with a basic material in solution at a pH between about 6 and 9.

16. The process of Claim 11, wherein the copper salt and
5 zinc salt are selected from the group of metal salts consisting of nitrates, sulfates, chlorides, acetates and combinations thereof, wherein the aluminum salt is selected from the group consisting of aluminum nitrate, aluminum sulfate and combinations thereof, and wherein the alumina is
10 selected from the group consisting of bohmite, bayerite, gibbsite and combinations thereof.

17. The process of Claim 11, wherein the concentration of the metal salts and the aluminum component within the solution is from about 5 wt.% to about 30 wt.%.

15 18. The process of Claim 11, wherein the alumina comprises from about 40 to about 95% of the aluminum component.

19. The process of Claim 11, wherein the catalyst before
reductive activation comprises from about 5 to about 70%
20 copper oxide, from about 20 to about 50% zinc oxide, and from about 5 to about 50% aluminum oxide.

20. The process of Claim 11, further comprising adding a promoter or stabilizer material to the solution, wherein the promoter or stabilizer is selected from the group consisting

of Group I-A elements, Group IV-B elements and combinations thereof.

21. The process of Claim 11, wherein the BET surface area of the catalyst is from about 40 m²/g to about 200 m²/g and
5 the copper surface area of the catalyst is greater than about 15 m²/g.